

to them or whether it should be reserved for the species as found in Alabama is a matter for the taxonomist to decide.<sup>1</sup> Plants from three stations in Virginia have been investigated: Boyce, Clarke County; Roanoke, Roanoke County, and Mountain Lake, Giles County. Chromosomes of these plants were examined in smears of roots and anthers:  $2n = 28$  (FIG. 3),  $n = 14$  at first (FIG. 6) and second (FIG. 7) metaphase. Plants growing on different boulders at Mountain Lake varied somewhat in aspect but became alike under greenhouse culture; no differences in chromosomes were established.

If the Alabama and Virginia plants were euploid in relation to each other, *i. e.*, 12–24 or 14–28 in  $2n$ -numbers, and the chromosome set in each was morphologically comparable, the writer would not take the initiative, in spite of obvious phenotypic dissimilarities, of saying that two species are present in the *Sedum Nevii* complex. But the  $2n$ -number relationship is 12–28, and the chromosomes of the two sets are likewise unlike in size-range and in morphology. Two species are represented: many unpublished cytological data on *Sedum* support this conclusion.

To discover in this complex plants with a  $2n$ -number of 24 would not be surprising: their existence is here postulated; if found, it is expected that they will be referable to the species of which the Alabama plants are members.

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## THE DISSEMINATION BY ANTS OF THE SEEDS OF BLOODROOT, SANGUINARIA CANADENSIS

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IN RHODORA<sup>2</sup>, reference was made to the observations of Dr. E. B. Southwick<sup>3</sup>, who had seen ants carrying the seeds of

<sup>1</sup> *Sedum Nevii* Gray was briefly described by Asa Gray in Mem. Am. Acad. n. s. vi. 373 (1858), from a specimen sent by Rev. R. D. Nevius from along cliffs near Tuscaloosa, Alabama. In 1860 Chapman, Fl. So. U. S. 150, acknowledging in his preface the coöperation of Gray, gave a fuller description of *S. Nevii* from the Tuscaloosa material of Nevius; and in Gray, Man, ed. 5: 172 (1867) Gray included the plant of Salt Pond Mountain, Virginia under *S. Nevii*. True *S. Nevii* is, therefore, the Alabama plant.—EDS.

<sup>2</sup> BURTON N. GATES. Dissemination by Ants of the Seeds of *Trillium grandiflorum*. RHODORA, Vol. 42, No. 479, 1940, p. 196.

<sup>3</sup> As told by Dr. William Morton Wheeler. Ants, 1910, p. 315.



Bloodroot, *Sanguinaria canadensis* L., and feeding on their caruncles. Since this behavior is closely related to the reaction of ants toward seeds of *Trillium grandiflorum*, as reported by the author<sup>3</sup>, parallel observations have been made with the Bloodroot seeds.

These seeds have a pronounced caruncle, suggestive of a cock's comb, mounted as a crest on the seed. Differing from the caruncle of the Trillium seed, which is spongy and somewhat viscous, that on the Bloodroot seed is dry to the touch, elongated like a sausage, but with slight constrictions giving the caruncle a crinkled, wavy appearance. Transparent, filled with a firm gelatinous material which has no apparent taste to humans, it is approximately one-third the volume of the seed. The containing membrane is highly lustrous, resembles cellophane marked with milky-white, translucent blotches. Unlike Trillium seeds, which ants gnaw out of the capsule when it falls to the ground, Bloodroot seeds, being dry, rattle from their long tapering pod upon dehiscence.

Seeds were found to be ripe and falling, June 12, 1941 (Worcester, Mass.). When first observed, ants were roving beneath the plants, where a dozen or more of the bright, polished, red-orange seeds had fallen. Their color is almost identical with that of the juice exuded by the stems. However, it was impossible to detect that the ants were paying any attention to the fallen seeds. It was probable that some seeds had already been carried off by the ants, inasmuch as there remained too few seeds in relation to the opened seed-pods.

Freshly gathered Bloodroot seeds were then offered indiscriminately to ants found about the grounds, including some near the Bloodroot plants. In nearly all instances the ants were interested at least in biting the caruncle. Ants too small to carry a seed, mounted it and gnawed at the caruncle. A few ants were dropped into a small dish of collected seeds; they frantically tried to carry them off.

Fresh seeds were then offered at random to a series of ants, in order that those making positive reaction might be collected for identification. At one station, although a number of ants were

<sup>3</sup> Ibid and also in the sequel, Observations in 1940 on the Dissemination by Ants of the Seeds of *Trillium grandiflorum*. RHODORA, Vol. 43, No. 509, 1941, p. 206.



offered a seed, some merely crawled over it and hesitated; nearly all turned toward it and showed some interest in it. None of these ants, however, picked up the seed, although they were large enough to have done so. There was indication that the ants reacted less quickly and precipitously to the Bloodroot seeds, in some instances, than they did to the *Trillium* seeds in the 1939 and 1940 experiments.

Twelve ants, however, made prompt, positive reactions, usually dragging away the seed; these ants were collected and identified<sup>1</sup>. The twelve specimens comprised three species: the largest, *Formica neogagates*, the middle sized, *Myrmica emeryana*, the smallest, *Lasius americanus*. *Lasius americanus* is the only species which was also a positive reactor to the *Trillium grandiflorum* seeds<sup>2</sup> in 1940.

The Bloodroot plant, like the *Trillium*, has no mechanical means of disseminating its seeds. Dissemination is apparently effectively accomplished by ants which respond to the lure of the caruncle. Strasburger<sup>3</sup> accounts for the attractiveness of this lure to ants by the presence of an abundance of oils, explaining "the distribution of certain seeds by ants . . . , attracted to remove and accumulate the seeds, by the abundance of oil in the elaiosome-containing tissue of the appendages, such as the caruncle."

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EUPHORBIA GLYPTOSPERMA IN MASSACHUSETTS.—In the routine work of identifying plants received by a department of Botany, one occasionally chances upon a specimen of more than ordinary interest. Such was a lawn weed sent in recently by Mr. T. A. Bachand of Huntington, Massachusetts, and which we identified as *Euphorbia glyptosperma* Engelm. Through the kindness of the Gray Herbarium the specimen was submitted to Dr. L. C. Wheeler who recently contributed to *RHODORA* a revision of the *Chamaesyce* section of *Euphorbia*. Dr. Wheeler

<sup>1</sup> All identifications were made by Mr. Lawrence G. Wesson, Jr., Boston, Mass., whose kindness is much appreciated.

<sup>2</sup> *Ibid.*, *RHODORA*, 1941.

<sup>3</sup> Strasburger's *Text-book of Botany*. Fifth edition, by Dr. Fitting and others. 1921. p. 586-7.